

**MOBILE TERMINAL FOR DISPLAYING A RICH TEXT DOCUMENT COMPRISING
CONDITIONAL CODE FOR IDENTIFYING ADVERTISING INFORMATION
STORED LOCALLY OR ON THE INTERNET**

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to mobile terminals. More particularly, the present invention relates to a mobile terminal for displaying a rich text document comprising conditional code for identifying advertising information stored locally or on the Internet.

Description of the Prior Art

Mobile terminals, such as handheld computers, cellular phones, tablet computers, etc., may be used to view rich text documents, such as web pages from Internet web sites, email messages with embedded images, and PDF files. The mobile terminal may be used to view rich text documents downloaded from the Internet directly, or that have been cached in the local memory of the mobile terminal during a synchronization session. FIG. 1 shows a prior art configuration for synchronizing a mobile terminal 2 to a target computer 4 over a direct, wired connection 6 (e.g., a USB connection). The target computer 4 downloads rich text documents such as web pages from selected web sites off the Internet and transmits the web pages to the mobile terminal 2. The user is then able to view the web pages on the mobile terminal 2 while away from the target computer, such as while traveling. However, the web pages stored in the mobile terminal 2 may eventually become outdated and need to be refreshed through another synchronization session with the target computer 4. If the user is away from the target computer 4, the mobile terminal 2 must be synchronized remotely.

FIG. 2 shows prior art configurations for remotely synchronizing the mobile terminal 2 to the target computer 4 via the Internet 8. In one configuration, the mobile terminal 2 accesses the Internet 8 over a wired connection 10 (e.g., telephone lines) and an Internet service provider (ISP) 12. In another configuration, the mobile terminal 2 accesses the Internet over a wireless

1 network such as a cellular provider network (CPN) 14 or a short range wireless access point
2 (WAP) 15, such as Bluetooth, 802.11b, or HomeRF. In either case the bandwidth of the
3 communication channel is typically much less as compared to the bandwidth of the direct, wired
4 connection as in FIG. 1, thereby increasing the latency in accessing the data as well as decreasing
5 battery life. Further, a CPN 14 typically charges a higher connection fee. It is therefore desirable
6 to minimize the amount of information exchanged between the mobile terminal 2 and the target
7 computer 4 when synchronizing remotely in order to minimize the synchronization time, conserve
8 battery power, and minimize the connection fees.

9 Similarly, it is desirable to minimize the amount of information transmitted to the mobile
10 terminal 2 while browsing the Internet over a low bandwidth (and potentially expensive)
11 connection such as a wireless connection. The prior art has suggested to cache static information
12 associated with a web site within the mobile terminal 2 and transmit only the dynamic information
13 to reduce the amount of data transmitted to the mobile terminal. However, advertising
14 information in this context is considered dynamic information since it is updated on a periodic
15 basis (e.g., banner ads are rotated).

16 FIG. 3 illustrates a prior art mobile terminal displaying advertising information in the form
17 of banners 16A and 16B which may be any geometric shape (e.g., rectangular or square) and
18 which typically comprise an image such as a .JPG or .GIF image file. When the user clicks on the
19 banner, a web page is displayed having information related to the product or service advertised.
20 Although the banners are typically compressed, they contain a relatively large number of bytes as
21 compared to other web page content such as text. Banner ads are also evolving into larger
22 formats with richer content, such as animated .GIF files, which consume even more memory. The
23 click-through rate of banner advertising is also typically very low (e.g., less than two percent)
24 although still high enough to justify the expense for advertisers. Thus, bandwidth is consumed to
25 transmit the banner ads to the mobile terminal during a remote synchronization or wireless
26 browsing session even though a majority of the time the user will not click on the banner ads.

27 Yet another drawback associated with banner advertising is the delay associated with

1 downloading the banners from banner servers. Many Internet web sites use an advertising agency
2 to "serve" the banners with the site's content. This minimizes the overhead associated with
3 managing banner advertising while still generating revenue for the web site. Each time the web
4 site displays a web page, a banner is downloaded from a banner server of the advertising agency
5 and displayed within the web page. However, the banner servers are often saturated with
6 thousands of requests to serve banners, thereby delaying the transmission of the web page to the
7 user.

8 There is, therefore, a need to enhance the performance in transmitting information to a
9 mobile terminal, particularly with respect to synchronizing remotely or browsing the Internet
10 wirelessly, so as to minimize the access latency, conserve battery power, and minimize connection
11 fees.

12 SUMMARY OF THE INVENTION

13 The present invention may be regarded as a method of operating a mobile terminal
14 comprising a local memory and a screen. During a synchronization session, advertising
15 information is received over a first connection and stored in the local memory of the mobile
16 terminal. A rich text document is received over a second connection, wherein the rich text
17 document comprises conditional code comprising advertising display criteria including a first
18 identifier for retrieving selected advertising information stored in the local memory of the mobile
19 terminal and a second identifier for downloading the selected advertising information from the
20 Internet. The first identifier in the rich text document is processed to determine whether the
21 selected advertising information associated with the rich text document is stored in the local
22 memory of the mobile terminal, and the selected advertising information is retrieved if stored in
23 the local memory of the mobile terminal. If the selected advertising information is not stored in
24 the local memory of the mobile terminal, the second identifier is processed to download the
25 selected advertising information from the Internet. The rich text document is displayed on the
26 screen of the mobile terminal together with the selected advertising information.

27 In one embodiment the first connection operates at a first bandwidth, the second

1 connection operates at a second bandwidth, and the first bandwidth is substantially greater than
2 the second bandwidth. For example, in one embodiment the first connection comprises a wired
3 connection and the second connection comprises a wireless connection.

4 In one embodiment, the conditional code comprises hypertext markup language (HTML)
5 tags. For example, in one embodiment the first identifier comprises a first HTML tag, and the
6 second identifier comprises a second HTML tag. In one embodiment, the second identifier
7 comprises a universal resource locator (URL).

8 In one embodiment, the advertising information comprises a plurality of banner ads. In
9 one embodiment, the plurality of banner ads are displayed with the rich text document in a
10 predetermined rotation. In one embodiment, a type indicator is associated with each banner ad
11 wherein the type indicator is used to select a banner ad from the local memory for display with the
12 rich text document.

13 In one embodiment the rich text document is transmitted to the mobile terminal over the
14 second connection during a subsequent synchronization session. In an alternative embodiment the
15 rich text document is transmitted to the mobile terminal over the second connection during a
16 browsing session.

17 In one embodiment during the synchronization session the inventory of advertising
18 information stored in the local memory of the mobile terminal is evaluated, and updated
19 advertising information is selectively transmitted to the mobile terminal relative to the inventory of
20 advertising information. In one embodiment the updated advertising information displaces
21 outdated advertising information stored on the mobile terminal.

22 In another embodiment, the local memory of the mobile terminal stores tracking
23 information identifying the advertising information retrieved from the local memory and displayed
24 with the rich text document, wherein the tracking information is transmitted from the mobile
25 terminal to a target computer. In one embodiment, the tracking information further comprises
26 click-through data indicating a click-through rate for the advertising information displayed with
27 the rich text document.

1 In yet another embodiment, the advertising information comprises linked rich text
2 documents wherein during the synchronization session, the linked rich text documents are
3 transmitted to the mobile terminal over the first connection and stored in the local memory.

4 The present invention may also be regarded as a mobile terminal for communicating with a
5 target computer. The mobile terminal comprises a local memory for storing advertising
6 information received from the target computer over a first connection during a synchronization
7 session, and a screen. The mobile terminal further comprises a terminal controller for receiving
8 rich text document over a second connection, wherein the rich text document comprises
9 conditional code comprising advertising display criteria including a first identifier for retrieving
10 selected advertising information stored in the local memory of the mobile terminal and a second
11 identifier for downloading the selected advertising information from the Internet. The terminal
12 controller processes the first identifier in the rich text document to determine whether the selected
13 advertising information associated with the rich text document is stored in the local memory of
14 the mobile terminal, and retrieves the selected advertising information if stored in the local
15 memory of the mobile terminal. If the selected advertising information is not stored in the local
16 memory of the mobile terminal, the terminal controller processes the second identifier to
17 download the selected advertising information from the Internet. The terminal controller displays
18 the rich text document on the screen of the mobile terminal together with the selected advertising
19 information.

20 The present invention may also be regarded as a computer program embodied on a
21 computer readable storage medium for use in a mobile terminal comprising a local memory and a
22 screen. The computer program comprises code segments for:

23 during a synchronization session, receiving advertising information over a first connection and

24 storing the advertising information in the local memory of the mobile terminal;

25 receiving a rich text document over a second connection, wherein the rich text document

26 comprises conditional code comprising advertising display criteria including a first

27 identifier for retrieving selected advertising information stored in the local memory of the

1 mobile terminal and a second identifier for downloading the selected advertising
2 information from the Internet;
3 processing the first identifier in the rich text document to determine whether the selected
4 advertising information associated with the rich text document is stored in the local
5 memory of the mobile terminal, and retrieving the selected advertising information if
6 stored in the local memory of the mobile terminal;
7 if the selected advertising information is not stored in the local memory of the mobile terminal,
8 processing the second identifier to download the selected advertising information from the
9 Internet; and
10 displaying the rich text document on the screen of the mobile terminal together with the
11 selected advertising information.

12 The present invention may also be regarded as a method of transmitting data to a mobile
13 terminal, the mobile terminal comprising a local memory and a screen. During a synchronization
14 session, advertising information is transmitted to the mobile terminal over a first connection, the
15 local memory of the mobile terminal for storing the advertising information. A rich text document
16 is transmitted to the mobile terminal over a second connection, wherein the rich text document
17 comprises conditional code comprising advertising display criteria including a first identifier for
18 retrieving selected advertising information stored in the local memory of the mobile terminal and a
19 second identifier for downloading the selected advertising information from the Internet.

20 The present invention may also be regarded as a computer program embodied on a
21 computer readable storage medium for transmitting data to a mobile terminal, the mobile terminal
22 comprising a local memory and a screen. The computer program comprises a code segment for
23 transmitting advertising information to the mobile terminal over a first connection during a
24 synchronization session, the local memory of the mobile terminal for storing the advertising
25 information. The computer program further comprising a code segment for transmitting a rich
26 text document to the mobile terminal over a second connection, wherein the rich text document
27 comprises conditional code comprising advertising display criteria including a first identifier for

retrieving selected advertising information stored in the local memory of the mobile terminal and a second identifier for downloading the selected advertising information from the Internet.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a prior art configuration wherein a mobile terminal is synchronized to a target computer over a direct wired connection.

FIG. 2 shows a prior art configuration wherein a mobile terminal is synchronized remotely to the target computer over telephone land lines or over a wireless network via the Internet.

FIG. 3 shows a prior art mobile terminal for displaying advertising information, such as banner ads, together with a rich text document (e.g., a web page) downloaded from the Internet or from a target computer during a remote synchronization session.

FIG. 4 is a flow chart according to an embodiment of the present invention illustrating how advertising information is received over a first connection during a synchronization session and stored in the local memory of a mobile terminal, and displayed during a browsing session with a rich text document received over a second connection.

FIG. 5 shows a mobile terminal according to an embodiment of the present invention wherein the advertising information comprises a plurality of banner ads stored in the local memory by type (e.g., Business, Retail, etc.) and selected by type to be displayed with a related rich text document.

FIG. 6A is a flow chart according to an embodiment of the present invention illustrating how banner ads are cached within the mobile terminal while synchronizing locally over a high bandwidth connection (such as a local USB connection) to a target computer.

FIG. 6B is a flow chart according to an embodiment of the present invention illustrating how web pages are received over the second connection during a browsing session and displayed together with banner ads selected from the local memory.

FIG. 7A shows a mobile terminal according to an embodiment of the present invention comprising a local memory for storing advertising information received over a first connection during a synchronization session and displayed during a browsing session with a rich text

document received over a second connection.

FIG. 7B shows a mobile terminal according to an embodiment of the present invention wherein the local memory comprises a disk.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 4 shows a flow chart according to an embodiment of the present invention illustrating a method of operating a mobile terminal comprising a local memory and a screen. During a synchronization session (at step 18) advertising information is received over a first connection and stored in the local memory of the mobile terminal. At step 19 a rich text document is received over a second connection, wherein the rich text document comprises conditional code comprising advertising display criteria including a first identifier for retrieving selected advertising information stored in the local memory of the mobile terminal and a second identifier for downloading the selected advertising information from the Internet. At step 20 the first identifier in the rich text document is processed to determine whether the selected advertising information associated with the rich text document is stored in the local memory of the mobile terminal, and at step 21 the selected advertising information is retrieved if stored in the local memory of the mobile terminal. If the selected advertising information is not stored in the local memory of the mobile terminal, then at step 22 the second identifier is processed to download the selected advertising information from the Internet. At step 23 the rich text document is displayed on the screen of the mobile terminal together with the selected advertising information.

In one embodiment, the first connection operates at a first bandwidth, the second connection operates at a second bandwidth, and the first bandwidth is substantially greater than the second bandwidth. For example, in one embodiment the first connection may be a wired connection, such as a local USB connection, and the second connection may be a wireless connection.

In one embodiment, the advertising information comprises a plurality of banner ads. In one embodiment, the banner ads stored in the local memory of the mobile terminal are displayed with the rich text document in a predetermined rotation. For example, in one embodiment the

1 banner ads are rotated each time the rich text document is redisplayed. In another embodiment
2 the banner ads are rotated at a predetermined interval while displaying the rich text document.

3 In one embodiment, the advertising display criteria comprises a location within the rich
4 text document to display the selected advertising information. Any suitable method may be
5 employed for incorporating the display criteria into the rich text document, such as HTML or
6 XML code. An example code segment incorporated into a rich text document is shown below:

7 <p align="center">
8
9
10 </p>

11 In the above code segment, the "align" tag specifies the banner ad is to be displayed with a center
12 alignment. The "href" tag specifies the URL of the page to display if the banner ad is clicked on.
13 The "img src local" tag specifies that the banner ad image is stored locally on the mobile terminal
14 as "adv #5". The "border", "width" and "height" tags specify the physical characteristics of the
15 banner ad (in this example, no border, width of 468 pixels and height of 60 pixels).

16 An alternative example code segment incorporated into a rich text document is shown below:

17 <p align="center">
18
19
20 </p>

21 In this embodiment, the "img src local" tag specifies that the banner ad image is stored locally as
22 type "BUSINESS". When processing this code, the mobile terminal will retrieve the next
23 BUSINESS type banner ad in the rotation for display with the rich text document.

24 Yet another example code segment incorporated into a rich text document is shown below:

25 <p align="center">
26
27

1
2 </p>

3 In this embodiment, the "img src" tag specifies an alternative Internet address (e.g., URL) for the
4 banner ad image for downloading from the Internet in the event the mobile terminal does not
5 currently have "adv #5" stored in its local memory. This embodiment may also facilitate browsing
6 devices that do not cache advertising information or cannot interpret the "img src local" tag.

7 In yet another embodiment, a type indicator is associated with each banner ad, wherein the
8 type indicator is used to select a banner from the local memory for display with the rich text
9 document. This embodiment is illustrated in FIG. 5 which shows a mobile terminal 24 comprising
10 a local memory 26 for storing a plurality of banner ads by type. In the example of FIG. 5, the
11 banner ads include four types: BUSINESS, RETAIL, SPORTS and GENERAL. When a rich
12 text document is displayed related to one of these areas of interest, a corresponding banner is
13 selected from the appropriate category. For example, the mobile terminal 24 of FIG. 5 is
14 displaying a web page from a finance web site. The web page indicates that the banner ad 28 at
15 the top of the page should be of type "BUSINESS", and therefore the mobile terminal 24
16 retrieves a BUSINESS type banner from the local memory 26. The web page may indicate the
17 second banner ad 30 is of type "GENERAL" meaning a GENERAL type banner should be
18 displayed. In one embodiment, the banner ads for each type are rotated within each category as
19 shown in FIG. 5.

20 FIG. 6A is a flow chart according to an embodiment of the present invention illustrating
21 how banner ads are stored in the mobile terminal while synchronizing locally over a high
22 bandwidth connection (such as a local USB connection) to a target computer. At step 32 the
23 mobile terminal is configured for a local synchronization session, and at step 34 the inventory of
24 banner ads currently stored in the local memory of the mobile terminal is evaluated to determine
25 whether the inventory should be updated. In one embodiment, the "expiration" information for
26 each banner is stored within the mobile terminal, and the mobile terminal determines when to
27 update outdated banner ads with new banner ads. For example, a banner ad may expire after

1 having been displayed a predetermined number of times, or after a predetermined date. In another
2 embodiment, the target computer evaluates the inventory of banner ads stored in the mobile
3 terminal to determine which banner ads should be replaced. At step 36 the new banners are
4 transmitted from the target computer and stored in the local memory of the mobile terminal. At
5 step 38, other synchronization data, such as updated personal information management (PIM)
6 data, is exchanged between the mobile terminal and target computer as part of the synchronization
7 session. In one embodiment, only advertising information is transmitted to the mobile terminal
8 during the synchronization session.

9 FIG. 6B is a flow chart according to an embodiment of the present invention illustrating
10 how a mobile terminal downloads web page content from the Internet during an on-line browsing
11 session and selects the appropriate banner ads from local memory for viewing with the web page
12 content. At step 40 the mobile terminal is connected to the Internet, for example over a wireless
13 connection, to initiate the on-line browsing session. At step 42 a web page is transmitted to the
14 mobile terminal without the images for at least one of the banner ads incorporated into the web
15 page content. At step 44 the mobile terminal evaluates the web page to determine whether a
16 banner ad should be displayed that is stored in the local memory of the mobile terminal, and if so,
17 at step 46 the banner ad is selected from the local memory. At step 48 the web page content is
18 displayed on the mobile terminal together with the banner ad selected from the local memory.
19 This enhances the performance of the mobile terminal since retrieving the banner ads from the
20 local memory is much faster than downloading the banner ads from the Internet over a limited
21 bandwidth communication channel.

22 The aspects of the present invention also improve the performance of a remote
23 synchronization session to a target computer over a limited bandwidth communication channel.
24 During the local synchronization session of FIG. 6A, the banner ads are transmitted and stored in
25 the local memory of the mobile terminal. Because the bandwidth of the local communication
26 channel (e.g., USB connection) is relatively wide, the banner ads are downloaded quickly into the
27 mobile terminal. During a remote synchronization over a lower bandwidth communication

1 channel (e.g., over a wireless connection), the rich text documents of interest are transmitted to
2 the mobile terminal without the banner ad images, thereby reducing the time and cost to perform
3 the remote synchronization. While the user is browsing off-line through the cached rich text
4 documents, the appropriate banner ads are selected from the local memory for display with the
5 rich text document.

6 In one embodiment, during the synchronization session the banner ads are downloaded to
7 the mobile terminal from selected web sites. In another embodiment, the banner ads are
8 downloaded to the mobile terminal from a banner server of an advertising agency. The mobile
9 terminal tracks which rich text documents are displayed during on-line or off-line browsing
10 sessions, together with which banner ads are selected from the local memory for display with the
11 rich text document. In one embodiment, the mobile terminal also tracks "click-through" rates for
12 each banner ad. During a synchronization session, the tracking information is transmitted from
13 the mobile terminal to the web site or banner server so that the appropriate billing information for
14 each banner advertiser can be generated, as well as the commission payments for each of the web
15 site content providers.

16 In one embodiment, the banner ads are linked to other rich text documents that comprise
17 information to the product or service being advertised. During the synchronization session, the
18 linked rich text documents are transmitted to the mobile terminal over the first connection and
19 stored in the local memory. During a browsing session, if the user clicks on a banner ad, the
20 linked rich text document is retrieved from the local memory and displayed on the mobile terminal
21 rather than downloading the linked rich text document from the Internet.

22 FIG. 7A shows a mobile terminal 50 for communicating with a target computer according
23 to an embodiment of the present invention. The mobile terminal 50 comprises a local memory 52
24 for storing advertising information received from the target computer over a first connection
25 during a synchronization session. The mobile terminal 50 further comprises a screen 54 and a
26 terminal controller 56. The terminal controller 56 for receiving a receiving rich text document
27 over a second connection, wherein the rich text document comprises conditional code comprising

1 advertising display criteria including a first identifier for retrieving selected advertising information
2 stored in the local memory of the mobile terminal and a second identifier for downloading the
3 selected advertising information from the Internet. The terminal controller 56 processes the first
4 identifier in the rich text document to determine whether the selected advertising information
5 associated with the rich text document is stored in the local memory 52 of the mobile terminal,
6 and retrieves the selected advertising information if stored in the local memory 52 of the mobile
7 terminal. If the selected advertising information is not stored in the local memory 52 of the
8 mobile terminal, the terminal controller 56 processes the second identifier to download the
9 selected advertising information from the Internet. The terminal controller 56 then displays the
10 rich text document on the screen of the mobile terminal together with the selected advertising
11 information. In the embodiment of FIG. 7A, the mobile terminal 50 further comprises a
12 communication interface 58 for communicating with the target computer, and a user interface 60
13 for receiving user input from a keyboard 62 as well as the screen 54.

14 FIG. 7B shows a mobile terminal 64 according to an embodiment of the present invention
15 wherein the local memory comprises a disk 66. The mobile terminal 64 further comprises
16 components for enabling the disk storage, including a voice coil motor (VCM) 68 and spindle
17 motor 70, a servo controller 72, a preamp 74, a read/write channel 76, and a disk controller 78.
18 In the embodiment of FIG. 7B, the mobile terminal 64 comprises semiconductor memory 80 that
19 is shared by the terminal controller 56 and disk controller 78 to reduce the cost of the mobile
20 terminal 64. In another embodiment, the terminal controller 56 executes a disk caching algorithm
21 for caching data read from and written to the disk 66. In the embodiment of FIG. 7B, the disk 66,
22 VCM 68, spindle motor 70 and preamp 74 are implemented within a head disk assembly (HDA)
23 82, the servo controller 72, read/write channel 76 and disk controller 78 are implemented on a
24 first printed circuit board (PCB) 84, and the terminal controller 56 and semiconductor memory 80
25 are implemented on a second PCB 86. In an alternative embodiment, the servo controller 72,
26 read/write channel 76, disk controller 78, terminal controller 56, and semiconductor memory 80
27 are implemented on a single PCB.

1 In one embodiment, the local memory of the mobile terminal (e.g., the disk 66 in FIG. 7B)
2 stores a computer program comprising a code segment for receiving advertising information over
3 a first connection during a synchronization session and storing the advertising information in the
4 local memory of the mobile terminal. The computer program further comprises a code segment
5 for receiving a rich text document over a second connection, wherein the rich text document
6 comprises conditional code comprising advertising display criteria including a first identifier for
7 retrieving selected advertising information stored in the local memory of the mobile terminal and a
8 second identifier for downloading the selected advertising information from the Internet. The
9 computer program further comprises a code segment for processing the first identifier in the rich
10 text document to determine whether the selected advertising information associated with the rich
11 text document is stored in the local memory of the mobile terminal, and retrieving the selected
12 advertising information if stored in the local memory of the mobile terminal. The computer
13 program further comprises a code segment for processing the second identifier to download the
14 selected advertising information from the Internet if the selected advertising information is not
15 stored in the local memory of the mobile terminal. The computer program further comprises a
16 code segment for displaying the rich text document on the screen of the mobile terminal together
17 with the selected advertising information.